

# Why Labor-based Programs have had Limited Success and What to do About it: Evidence from Ghana

by

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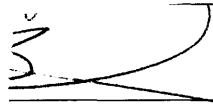
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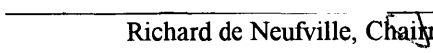
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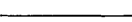
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Submitted to the Department of Urban Studies and Planning and the School of Engineering on May 25, 1995 in Partial Fulfillment of the Requirements for the Degrees of Master in City Planning and Master of Science in Technology and Policy

## **ABSTRACT**

Since the 1970s, donors and international organizations have promoted labor-based (LB) methods for road rehabilitation as one means to mitigate rural unemployment in developing countries. In contrast to equipment-based (EB) methods, which employ only about 10 laborers and heavy equipment, LB methods employ between 150-200 laborers and light equipment to rehabilitate gravel roads to equivalent quality. Unlike other employment-generating programs, LB road rehabilitation programs can be justified on financial grounds and, therefore, appear to offer the potential of combining the employment generating benefits of public works with the efficiency benefits of private sector delivery. Why then do private contractors continue to prefer EB methods for gravel road rehabilitation? This thesis offers explanations by drawing upon the experiences of a LB road program in Ghana.

The literature suggests two explanations for contractors' reluctance to adopt LB methods. First, contractors believe the cost of learning this new technology is high. Programs designed to promote LB methods have always include subsidized training to address this problem. My findings suggest that the importance of training is often overrated. Second, and more fundamental, some have argued that the cost of managing large labor forces, which is unaccounted for in unit-cost comparisons, actually makes LB methods less competitive than EB methods. My findings show that for many contractors, LB methods are, in fact, financially more attractive but that market-structure conditions can thwart their use. Unit-rate cost comparisons of LB and EB methods, therefore, while an important aspect of the problem, are insufficient to predict firm behavior. In particular, there is a very important distinction between small and large contractors.

My research indicates that LB methods are more attractive for small firms than for large firms. Small firms tend to find LB methods more competitive; since these firms are small, they can supervise their sites themselves, and so find it easier to develop strategies to increase worker productivity and control truancy problems. Moreover,

unlike large firms, small firms who wish to use EB methods, face high variable costs; they either own older, less efficient equipment—with high maintenance costs—or must rent equipment at a high cost. For large firms, in contrast, LB methods are much less attractive. Large firms have high costs of monitoring because of their size and because they often undertake many projects simultaneously. In addition, large firms have lower variable costs than LB firms, who must make wage payments of up to 40% of their total cost. Therefore, if large firms experience a lull in contracts, they can use equipment to underbid small firms for small contracts, or “fill in” work, that uses otherwise idle equipment. Thus, while small firms have the ability and the incentive to supervise their sites closely and learn to manage large labor forces, large firms have little incentive to do so. Market structure, therefore, has a strong influence on the adoption of LB methods.

The other factor that causes small firms to resist using LB methods is the government’s habitual delay in payments. Late payments mean small LB firms are unable to pay their laborers and strikes result. Although donors often create mechanisms to ensure timely payments during the pilot phase, these mechanisms are often temporary, and delayed payments once again become common in the program phase. Prompt payments are less critical for large EB firms because their wage bill is lower and because they undertake many projects at once and thus can “swap” payments from one project to another to help fill the gap. Prompt payments, surprisingly, are also less critical for small EB firms because in Ghana, unlike most of Africa, contractors are able to obtain supplies on credit without paying interest and pay suppliers late if they themselves are paid late. Thus, payment delays in Ghana make LB methods less competitive than EB methods for both large and small firms, regardless of market structure.

Although Ghana’s experience with LB methods is still recent, it illustrates important lessons. Labor-based rehabilitation programs can be a successful device for generating rural employment and promoting private sector delivery. However, the previous framework for comparing LB and EB methods—using unit rates—is not sufficient for determining the competitiveness of LB methods in the private sector. Instead, my research is the first to propose a framework based on market structure and also emphasize the importance of timely payments to contractors. My findings indicate that, although program promoters focus predominantly on training, the success of LB programs actually hinges on paying contractors promptly and addressing market structure problems.

**Thesis Supervisor: Judith Tendler, Professor of Political Economy, DUSP**  
**Thesis Reader: Richard Tabors, Senior Lecturer and Research Engineer, LEES**

## **DEDICATION**

To all those Ghanaians who have made my experiences in Ghana so rewarding.

I thank you for your warmth, hospitality and understanding.

You have opened my eyes and changed the course of my life forever.

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# 1. INTRODUCTION

Employment in Sub-Saharan Africa (SSA) has become an ever-increasing concern for African governments and international organizations. For the last five years, population in SSA has grown at an annual average of 3.2 percent while the economy's ability to absorb labor has grown at only 2.2 percent (Gaude and Watzlawick 1992). Since the early 1970s, the World Bank and ILO have proposed labor-based (LB) road rehabilitation as one means to deal with this growing unemployment problem. LB methods employ more than 150 laborers daily to produce 1.4 km of rehabilitated gravel road, which is fifteen times more employment than equipment-based (EB) methods. In addition, studies have shown these methods not only produce gravel roads of equivalent or greater quality than those EB methods produce, but in most developing countries, they are less costly, not only economically, but financially. Why, then, have LB programs rarely expanded beyond a pilot or small-scale stage? This thesis, drawing on the experiences of Ghana, attempts to answer this question and provide a framework for analyzing the viability of LB programs in other countries.

## 1.1 A BRIEF HISTORY OF LABOR-BASED METHODS IN THE ROAD SECTOR

The World Bank and International Labor Organization (ILO) were among the first international agencies to encourage developing countries to adopt LB technology in the road sector. In the 1960s, most government officials and private firms in developing countries had a distinct capital-intensive bias, though their countries were labor-abundant and capital-scarce. The ILO and World Bank blamed this bias on government policies that subsidized the cost of imported equipment and set wages above the marginal productivity of labor (Sadli 1974:368). These policies, they said, made EB methods appear cheaper than LB methods. The ILO and World Bank, however, argued that LB methods were justified on social and economic grounds and,

later, that, under certain conditions, they were actually more competitive financially as well.

The social justification for using LB methods was that they would reduce rural unemployment by providing jobs on the road sites. The need to address unemployment had become critical in the 1960s and 1970s. In 1971, widespread unemployment in Sri Lanka was linked to an eruption of violence; in Tanzania, urban migration caused social unrest leading the government to forcefully remove unemployed workers from the cities. Researchers blamed this social unrest on the migration of the rural underemployed to the cities which were not capable of absorbing them into the labor force (Edwards 1974:4). Two factors made rural areas less attractive than urban areas: the increasing population growth in rural areas; and the tendency of government to concentrate infrastructure and industry in cities. LB road rehabilitation was one means of resolving both the need for rural employment and the urban bias in infrastructure investment. In Kenya, for example, between 1986 and 1993, the Minor Roads Program rehabilitated 3,240 kms of gravel roads and in 1992/93 alone, employed 13,552 casual laborers.<sup>1</sup>

LB methods were economically justified because, when the financial prices for labor and imported equipment were replaced with their shadow prices, LB methods were shown to be less costly than EB methods.<sup>2</sup> Shadow prices were used during the early 1970s because distortions in wages caused by minimum wage legislation, and in equipment costs caused by artificially low foreign-exchange rates, made LB methods appear more costly than EB methods. The other economic justifications for using LB methods were that they: (i) reduced a country's expenditures on imported equipment

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<sup>1</sup> 3,240 km of gravel roads represents 12% of the total kms. of gravel road based upon figures from Republic of Kenya Roads 2000 Pilot Project Summary Report. 13,552 casual laborers represents 0.12% of the total labor force based upon figures from the World Bank's World Development Report 1994. Total labor force is the "economically active" population including the armed forces and the unemployed.

<sup>2</sup> See Coukis 1983:33-34 for an example.

and, therefore, reduced dependence on scarce foreign exchange (Department of Feeder Roads 1989); and (ii) avoided delays in procuring imported spare parts (World Bank 1991).

Based upon the social and economic justifications discussed above, the World Bank and ILO designed LB programs for public sector force account units. These organizations initially focused on the public sector, rather than the private sector, for two reasons: distorted factor prices in the economy and made EB methods financially cheaper than LB methods for private sector firms; and many African countries had not yet developed local private sector capacity for contracting road works. For example, in Kenya, Malawi, Lesotho and Botswana, the government road agencies themselves carried out all aspects of construction, rehabilitation and maintenance.

Although the World Bank and ILO targeted LB programs to the public sector, arguing that these methods had both social and economic benefits, few governments showed interest in introducing these methods into their road programs. Initially, most government officials and engineers held the common misconception that LB methods were a "backward" technological alternative that used no equipment. The ILO, in fact, did not propose that African roads be built using no equipment but encouraged using the most cost-effective combination of labor and light equipment for gravel road rehabilitation. In most countries, this translated into using labor and light equipment such as tractors, trailers, towed water bowsters, chain saws, tipper trucks, and hand tools (cutlasses, pick-axes, rakes, etc.).

Yet, even once these misconceptions about LB methods were removed, developing countries still resisted adopting them. A review of the experience in such countries as Mexico, Brazil, Colombia, Thailand, Guatemala, Haiti, Bangladesh, Kenya, and Botswana provides five reasons why government officials might prefer EB methods

over LB ones. **First**, gravel road rehabilitation using EB methods is comparatively faster than the same rehabilitation using LB methods. For example, in Ghana, EB rehabilitation is approximately 1.5 times faster than LB rehabilitation (Ashong 1994). **Second**, EB methods can easily meet high engineering standards, such as rehabilitating gravel roads with seven-meter-wide carriageways plus shoulders, while LB methods can only meet lower specifications, such as rehabilitating gravel roads six meters or less in width.<sup>3</sup> The World Bank and other donors argue that, although narrower roads reduce vehicular speeds and the ability to overtake other vehicles, they are cheaper and easier to maintain (Riverson *et al.* 1991). **Third**, EB methods minimize management problems because these methods require about 10 permanent laborers per gravel road while LB methods require over 100 casual laborers per gravel road (Edwards 1974; Edmonds and Miles 1984:30). Experiences with LB programs in Asia have shown them to be plagued by problems of poor supervision, corruption and low worker motivation (Riverson *et al.* 1991). Government officials who supervise the sites have added phantom workers to the payroll in some cases, and many projects have been referred to as “make-work” projects because worker productivity has been so low (Gaude and Watzlawick 1992; Bruton 1974). **Fourth**, EB methods may have political benefits because government officials can quickly mobilize equipment to do work for their supporters, whereas labor is more difficult to mobilize. Before elections, top government officials in Zimbabwe used government tractors to plow farmers' fields and thus garner votes. **Fifth**, EB methods can command more funding than LB methods when donors will only finance the foreign exchange costs of a project (Tendler 1979a). Therefore, governments who are aiming to maximize the donor contribution will find LB projects less attractive than EB projects.

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<sup>3</sup> LB methods are suitable for rehabilitating roads six meters or less in width because the material excavated from the ditches is sufficient to build up the road profile. If the road is wider, a contractor must excavate and haul additional material to build up the road profile. The ILO views extensive excavation and movement of earth as unsuitable for labor-based methods in Africa.

To develop stronger arguments for using LB methods, the World Bank and ILO evaluated a number of projects to explore the cost issue. Whereas LB methods had earlier appeared more costly in actual cost-per-km than EB methods, extensive studies based on unit rates for equipment and labor now showed the reverse to be true in low-wage countries (less than US\$2.50/day). For example, in the mid-1970s, the World Bank used a unit-rate analysis to reevaluate a road construction project that had been completed using EB methods in Kenya, a country where the wage level was below US\$2.50/day. This analysis showed that the roads could have been built more cheaply using LB methods (Tendler 1979a). Appendix 2 illustrates the framework for this unit-rate analysis, which became the cornerstone for determining the financial feasibility of LB methods. Because this framework demonstrated that LB methods were cheaper than EB methods in most of SSA, the World Bank and ILO began to justify using LB methods on financial and not just economic grounds.

Surprisingly, even though LB methods were now shown to be financially cheaper than EB methods, private sector firms in Africa continued to use EB methods for road rehabilitation. The literature suggest two reasons why. Contractors accustomed to using EB methods assigned a cost to learning this new technology. Although this cost was not quantified, they viewed it as prohibitive (Tendler 1979a). Also, the contractors saw the cost of managing a large labor force (i.e., supervision to increase labor productivity and efforts to reduce worker truancy problems) as making LB methods uncompetitive with EB methods. This cost of managing labor has never been included in the ILO and World Bank calculations although the competitiveness of LB works is critically dependent on labor productivity (Sadli 1974; Hirschman 1958; de Veen 1994).

The ILO attempted to address these problems through program interventions that (i) provided contractors with training and thus subsidized the contractors' cost of adopting this new technology; and (ii) introduced a payment system meant to increase

worker productivity. The payment system promoted by the ILO was the task-rate system, whereby laborers were paid according to output, instead of according to time worked. The ILO contends that laborers will be motivated to work harder if their wages are tied to output rather than to time. In some developing countries, instituting such a system is difficult because the labor unions view it as exploitative. For example, a task-rate system does not allow for overtime pay or for paid holidays, and does not hold a contractor responsible for paying a laborer who only completes a portion of his task due to inclement weather or poor site organization.

In 1986, Ghana became the first SSA country to launch a program introducing LB methods in the local road contracting industry. The government established a LB road rehabilitation pilot project in the Sefwi Wiawso district of the Western region. The World Bank and the United Nations Development Program (UNDP) provided financial assistance for the project; the ILO provided technical assistance. The program designers decided that the program would target contractors instead of force account units because, at that time, Ghana appeared to have an ideal environment for introducing LB methods into the local contracting industry. Unlike many other African countries, a private road contracting industry had existed in Ghana since the late 1950s, after independence. By 1986, Ghana's local road contracting industry was already well developed with private sector firms capable of executing road works over US\$2,000 and a public sector capable of administering the contracts (Appendix 4). In addition, the Ghanaian wage rate was less than US\$1/day and thus was below the World Bank and ILO's stated threshold. Because the program targets private sector firms, it includes the two interventions mentioned earlier. It subsidizes the cost of learning LB methods by providing contractors with training, and it introduces a task-rate system for paying labor. In addition, up until 1994, the program allowed only program participants to execute LB contracts, which were awarded based upon engineers cost estimates and not tendered bids. In this way, the program protected its

own contractors from EB contractors outside the program and placed them in a “cost-based” market.

At first glance, the program appears very successful: between 1986 and 1994 the program created some 2.6 million man-days of employment, paying out US\$1.4 million in wages, and rehabilitated 1,190 km of gravel roads. In addition, and of crucial importance, LB methods were shown to cost approximately US\$13,500/km with an average rate of completion of 1.4 km/mo. while EB methods cost approximately US\$20,250/km<sup>4</sup> with an average rate of completion of 2.1 km/mo. Thus, not only are LB methods 25% cheaper than EB methods but they are more profitable in a “cost-based” market, even though EB methods are faster. As Table 1 illustrates, if the government pays both contractors the equivalent sum of say US\$21,000/km, the small contractor using LB methods will make approximately seven times more profit per month than the small contractor using EB methods.

**Table 1: Monthly Profit for EB and LB Contractors**

Measure	Unit	Equipment-based	Labor-based
payment / km	(US\$/mo.)	21,000	21,000
cost / km <sup>5</sup>	(US\$/km)	20,250	13,500
profit / km	(US\$/km)	750	7,500
speed	(km/mo.)	2.1	1.4
monthly profit	(US\$/mo.)	1,575	10,500
<b>Monthly profit ratio</b>		<b>1</b>	<b>7</b>

Yet, although the LB program appears to prove the competitiveness of LB methods, if one examines the program more closely, one will find that it has not sustained the use of LB methods among contractors. For example, by 1994, many of the first-trained contractors were considering leaving the program because they found LB methods

<sup>4</sup> Contractors executing equipment-based rehabilitation in September 1993 were being paid US\$22,500 per km thus, assuming a profit margin of 10 percent,<sup>4</sup> their costs were approximately US\$20,250 per km.

<sup>5</sup> I calculated this number by assuming that equipment-based contractors earn, on average, 10% profit.

"unprofitable."<sup>6</sup> Finally, many in the program planned to either return to EB methods or move into other areas of the economy such as housing construction. This paper attempts to answer why.

## 1.2 PRINCIPAL FINDINGS

**First**, though managing large labor forces is the problem it has been thought to be for large firms, it is not for small firms.<sup>7</sup> The key to understanding why, lies in the market structure for civil contractors. Although donors often use unit-rate cost comparisons of LB and EB methods to persuade governments to initiate LB programs, these unit-cost comparisons do not predict firm behavior. In particular, there is a very important distinction between large and small firms; large firms do not find LB methods attractive while small firms do. Large firms have high costs of monitoring because of their size and because they often undertake many projects simultaneously. In addition, large firms can use equipment to underbid LB firms for rehabilitation contracts because large firms have lower variable costs than LB firms whose wage payments often make up 40% or more of their total costs. Thus, large contractors have little incentive to use LB methods or learn to manage large labor forces well. Small firms, on the other hand, can supervise their sites themselves, and so find it easier to develop strategies to increase worker productivity and control truancy problems. Moreover, unlike large firms, small firms who wish to use EB methods face high variable costs; they either own older, less efficient equipment—with high maintenance costs—or must rent equipment at a high monthly rate. Thus, small contractors not only have the ability to learn how to manage labor well, they also have the incentive to do so.

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<sup>6</sup> From 1986-1994, contractors were paid for road rehabilitation based upon DFR engineers estimates, and not tendered prices. Therefore, since payments were fixed at a precise amount, profit was determined to be the total payment for the complete works minus the cost of the completed works.

<sup>7</sup> "Small" and "large" refer to turnover, assets and number of permanent employees. They do not refer to the number of casual employees.



The success of small Ghanaian contractors in managing their large labor forces can be demonstrated by the strategies they have developed on their own to increase labor productivity and control truancy on their sites. Some of these strategies are actually different from those taught in the ILO-designed training course. For example, contractors found that group work raises productivity because camaraderie encourages the laborers to work harder and this is incompatible with the individual approach to the task-payment system. In addition, although the task-payment system is built on the Western ideal of employment being contractual and based on a set conditions of service, my findings show that the relationship between the contractor and his workers is influenced more by trust than a concrete contractual payment system. With respect to controlling truancy, contractors have actually had more difficulties with supervisors than with laborers. Contractors, however, have been able to develop strategies to monitor supervisors by either visiting the site themselves (top-down monitoring), or developing a group of informers (bottom-up monitoring). In the first case, a contractor will come to the site every day to monitor his supervisors. In the second case, a contractor will encourage laborers to prove their loyalty to the firm by reporting misconduct among supervisors.

**Second**, it is government's habitual late payments—frequent in so many less developed countries—and not an inability to manage large labor forces, that causes small contractors to leave the LB program. Although program promoters often create mechanisms to ensure timely payments during the pilot phase, these mechanisms are often temporary, and delayed payments once again become common in the program phase. Prompt payments are less critical for large EB firms because their wage bill is lower and because they undertake many projects at once and thus can “swap” payment from one project to another to help fill the gap. Prompt payments, surprisingly, are also less critical for small EB firms because in Ghana contractors operate in a “buyer’s” market—unusual in most of Africa—that enables them to obtain supplies on

credit without paying interest and pay suppliers late if they themselves are paid late. Although the literature on LB road rehabilitation recognizes payment delays as a significant problem, it does not recognize the how payment delays in a “buyer’s” market, such as that found in Ghana, can affect a small contractor’s decision to use either LB or EB methods.

### 1.3 THE LABOR-BASED ROAD REHABILITATION PROGRAM IN GHANA

#### 1.3.1 How it emerged

Ghana's road network was originally constructed during the 1950s, using capital-intensive methods. The British colonial administration at that time viewed unskilled labor as relatively unproductive, and thus began constructing the road network using the EB methods prevailing in Britain. After independence, Ghana began developing its local road contracting capacity, which, together with government force account units and timber and gold companies, continued to use EB methods to construct the road network. By 1991, there were 146 contractors registered for EB paved and unpaved road construction, rehabilitation and maintenance. Of these, ten could tender up to about US\$2 million and four could complete works up to any value. In addition, Ghana had 310 contractors registered for bridges and culverts. Of these, 15 could complete works up to about US\$0.8 million, and five could complete works up to any value (Appendix 4).

During the late 1970s and early 1980s, the Ghanaian economy declined due to poor economic policies and a deterioration in the external terms of trade. Import volumes fell by one third, real export earnings by 52%, and domestic savings and investment from 12% of GDP to insignificant levels.<sup>8</sup> In addition, the repatriation of over one

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<sup>8</sup> Economic figures are from “World Bank Country Briefs as of June 30, 1994.”

million Ghanaians from Nigeria in 1982/83, together with a prolonged drought, resulted in increased unemployment to well over 20%. Lack of foreign exchange to import spare parts resulted in the government neglecting to maintain its 17,000 km of feeder road network and, by 1984, more than half of this feeder road network had deteriorated and needed rehabilitation. Poor quality of the roads significantly increased the costs of transporting agricultural goods and therefore discouraged production (Department of Feeder Roads 1994). In some fertile farming areas, transportation costs, normally accounting for 15-20% of marketing costs, rose to account for as much as 70% of marketing costs. In other areas, the deterioration of rural roads halted all movement of cocoa to the market (World Bank 1991).

In 1981, during this economic crisis, the Department of Feeder Roads (DFR) was established as the focal point for feeder road development. Prior to its establishment, feeder roads were the responsibility of various agencies including the Ghana Highways Authority and the Ghana Cocoa Board. The DFR operated at four levels in: the head office in Accra, regional offices at the regional capitals, road area offices (responsible for 3-4 districts), and district offices. At the head office in Accra, the DFR planned and integrated feeder road rehabilitation and maintenance within the priorities of the Ghana Highway Authority and the Ministry of Agriculture. At the regional level, DFR engineers served as chief advisors to the Regional Secretaries, and coordinated the distribution of resources among the road area offices. At this level, DFR engineers provided the District Secretary and District Assembly with technical assistance for setting priorities and estimating the cost of rural road maintenance.

Around 1984, while on a government-sponsored educational leave in Europe, Bashiru Sakibu, Director of the DFR, learned that the ILO and World Bank had introduced LB methods in other African countries, such as Kenya, Botswana, Malawi and Lesotho. These methods heretofore had only been executed by force account in Africa. Upon his return to Ghana, Sakibu championed the use of these new methods because he

believed that LB rehabilitation could upgrade the quality of Ghana's rural roads and, at the same time, provide much needed employment in the rural areas. In addition, because LB methods could be justified on financial grounds, they appeared to offer the efficiency benefits of private sector delivery using Ghana's already well-developed contracting industry.

### 1.3.2 Main Characteristics of the Program

Although the Ghanaian LB program was the first of its kind, it shares four characteristics with the ILO's programs in other African countries. **First**, the ILO designed the project so that the main beneficiaries would be the rural casual laborers within the vicinity of the road works. The ILO and DFR imposed a casual labor profile whereby at least 70% of a contractor's casual labor force had to be local laborers—"new hands"—and fewer than 30% could be casual laborers who lived outside the vicinity but had worked with the firm before—"old hands." This constraint was an effort to create more rural employment and reduce the contractors' cost of transporting laborers. **Second**, the ILO designed the project so laborers could be paid using a task-rate system. Although this system of payment is normally considered illegal in Ghana because it does not allow for overtime pay or for paid holidays, the Trades Union Congress (TUC) gave the DFR special license to use it, most likely because the casual laborers in the rural areas are not unionized, and therefore not represented by TUC. **Third**, the ILO trained participants in labor management. This training was done in both the classroom and the field. **Fourth**, the ILO lowered the design specifications for rural roads to now allow for road widths of six meters or less. The ILO justified this change by claiming that, although a smaller width would slow vehicular speeds and make overtaking more dangerous, it would enable the DFR to rehabilitate more gravel roads for a given financial allocation since narrower roads are less expensive.

The Ghanaian LB program is also uniquely innovative in providing incentives for contractors to join. **First**, the program includes a subsidized training course for contractors and their supervisors consisting of six weeks of full-time classroom work for the supervisors, using mainly ILO training manuals. Contractors must sponsor four supervisors to attend the course and pay only for their living expenses. Unlike its programs in other African countries, the ILO in Ghana trains participants in financial management and tendering procedures. After the classroom work, contractors complete 14 weeks of practical field work involving the rehabilitation of a 10-km model road. Then each contractor is given a contract to rehabilitate a 5-km road. If he performs up to standard on this road, he is awarded a contract of 20 km. **Second**, the program assists in establishing commercial bank loans<sup>9</sup> of up to US\$160,000 for contractors to purchase the proscribed set of light equipment suitable for LB works: three tractors (60 HP), six trailers (3m<sup>3</sup>), one towed water bowser (2,250 liters), one water pump, two vibratory pedestrian rollers, one chainsaw machine, one tipper truck (5m<sup>3</sup>), one pick-up, and one set of hand tools (cutlasses, pick-axes, rakes, etc.). This World Bank loan was designed as a hire-purchase agreement through the Bank for Housing and Construction (BHC): the Ministry of Roads and Highways issues checks for works completed in the joint names of the contractor and the BHC. The BHC then makes deductions for the equipment leased to the contractor.

**Third**, the program reduces the bias against small contractors in standard tender documents by: (i) discarding the requirement to register and to possess a minimum amount of equipment; (ii) making the contract documentation simple and straightforward by removing much of the legal jargon; and (iii) reducing contract sizes to US\$350,000 or less to allow bidding by small LB contractors. **Fourth**, and crucial

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<sup>9</sup> The loans had a repayment period of 4 years and an interest rate of 20% if the loans was made in US dollars and 30% if the loans was made in Cedis. The BHC protected itself from default by insisting the contractors have collateral to participate in the hire-purchase agreement.

to this paper, the training program advanced payments to the contractors for labor, thereby ensuring an adequate cash flow during the pilot project.<sup>10</sup> These advance labor payments accounted for as much as 40% of the invoice value. At the conclusion of the pilot phase, and central to my major findings, the DFR stopped providing advance payments for labor and centralized the payment system. The purpose of this centralization was to allow the BHC to administer the hire-purchase arrangement from its central branch in Accra.

#### 1.4 METHODOLOGY

My findings are based on two months of field work I conducted during the summer of 1994. I interviewed LB contractors, their supervisors, and laborers, in five regions of Ghana where LB firms were equipped: Western, Brong-Ahafo, Northern, Ashanti and Eastern. I limited my interviews to the LB firms that were already equipped, excluding those that were still awaiting delivery of their equipment because the equipped firms were the first to finish the training course and, thus, had the greatest experience with LB rehabilitation.

Of the 26 equipped firms, I interviewed 13. Of these 13, two had been prominent EB road firms building asphalt and gravel roads before participating in the program, six had been small building-contracting firms, three had been small road-contracting firms building small culverts before the program, one was a ammunition-selling firm and one did not exist as a firm before the program. The contractor in this last firm had been a permanent employee of one of the largest civil engineering firms in Ghana, and only

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<sup>10</sup> The first six contractors who participated in the pilot project submitted labor bills at the end of the month for vetting by the Project Engineer. The Project Engineer then inspected the work and issued a check for labor costs so that the contractor could pay his workers on the third day of every month. Payments for work completed (minus the labor advance) were endorsed by the district and regional administrations, and final certificate payments were made at the DFR head office in Accra.

created his own firm to participate in the LB program. In addition, I interviewed two unequipped road contractors and one prominent building contractor. To protect the identities of my interviewees, I have assigned them pseudonyms.

In addition to contracting firms, I interviewed DFR officials, an opinion leader at the district level and villagers in three different villages that had had their gravel road rehabilitated under the ILO pilot phase of the LB program in the mid-1980s. The list of firms interviewed and information on other interviews appears in Appendix 1.

Throughout the remainder of this paper, "LB road contractors" refers to those road contractors who have completed the DFR labor-based course. "EB road contractors" refers to all contractors who, whether they have completed the DFR labor-based course or not, continue to construct and rehabilitate roads using the conventional capital-intensive methods—namely, graders, excavators, rollers and tipper trucks.

## 1.5 THE STRUCTURE OF THE THESIS

This thesis is divided into four chapters. Following this introductory chapter, chapter Two compares small contractors to large contractors with regard to market structure and managing large labor forces. It discusses why large firms have less capability and less motivation to use LB methods than do small firms. It then illustrates these successes small firms have had using LB methods by identifying the strategies small contractors have developed to increase worker productivity and control worker truancy. Chapter Three compares small contractors to large contractors with regard to their sensitivity to payment delays. It discusses why small LB contractors are more sensitive to payment delays than are both small EB contractors and large EB contractors. The concluding chapter highlights my findings and the contribution they make to the thinking about LB programs.

## **2. LARGE FIRMS VS. SMALL FIRMS: ARE SMALLER FIRMS BETTER AT MANAGING LABOR THAN LARGER ONES?**

### **2.1 INTRODUCTION**

LB methods can only be competitive with EB methods if labor is managed well. As one Indonesian government official concluded, “reasonable levels of labor productivity” are crucial to the success of LB programs (Sadli 1974:369). An ILO technical advisor warns that if planners believe such skills to be lacking in a country, they may doubt the feasibility of using LB methods and rather choose EB methods for which they can get expertise from the international market (Hussain 1993:8). These statements tying the competitiveness of LB methods to labor productivity are not new. Hirschman was one of the earliest theorists to raise this point. He argued that African managers viewed their supervisory role as “new, unfamiliar, and perhaps somewhat uncongenial” and, therefore, were incapable of motivating workers (1958:146). Thus, he concluded that developing countries will have a comparative advantage in those industries that do not require well-trained labor managers to motivate workers. For example, developing countries will tend to be comparatively better at smelting than at construction, because, in the former, the machine can play the role of the manager in motivating the workers to keep a steady pace. Hirschman’s conclusion implies that management in undeveloped countries is incapable of motivating workers to be productive. Is this so?

In its efforts to demonstrate the competitiveness of LB methods, the ILO has focused on the issue of labor management. Their approach to increasing labor productivity has been two-pronged: (i) institute a payment system that will motivate labor and increase productivity, and; (ii) provide site managers with training in labor management. I will expand on both of these below. Then, in the next section of this chapter, I will explain why large EB contractors have a poor record for labor management while small



contractors have been quite successful. In the following section, I will demonstrate the successes of small contractors by illustrating the strategies they have developed on their own to increase worker productivity. In the final section, I will present strategies small contractors have developed to control labor truancy on their sites. Surprisingly, it is the supervisors—not the laborers—with whom the contractors have the most difficulty. My findings show that the relationship between the contractor and his workers is greatly influenced by trust and less so, by the task-rate system.

### 2.1.1 Changing the payment system

Kilby (1961) was one of the first to attribute low labor productivity to lack of financial incentives. In his work, he implies that if managers changed the payment structures, African workers will become motivated, and productivity will rise. One such payment system is the task rate, whereby laborers are paid a daily wage for completing one task.<sup>11</sup> Several studies conducted in the 1960s and 1970s suggest that a task- or piece-rate system increases worker motivation, and hence worker productivity. For example, a World Bank study (1974) of Indian road construction workers found that piece-work payment was associated with productivities from 24-69% higher than work which was remunerated on a time-rate basis (i.e., daily wages). Another study by the ILO in Nigeria and Tanzania confirms this result (Horton and King 1981 cite ILO 1963).

The outcomes of these studies have led the ILO to adopt the task-rate system as the payment system of choice for LB programs. Although the ILO cannot dictate what payment system a contractor must use after he has completed the training, the ILO

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<sup>11</sup> Task-work is slightly different than piece-work because in a task-work system, the size of the task is calculated so that a laborer can complete only one in a day, while in a piece-rate system, the pieces may be small and, hence, many pieces may be completed in one day.

required contractors to employ laborers on a daily task work basis and agree with a training supervisory officer on a task level during the training (Osei-Bonsu 1992).

### 2.1.2 Training in management

Organizing and controlling labor is crucial to the success of LB programs. Past experiences with LB methods have proven disappointing because they have been plagued by problems of supervision and stealing (Riverson *et al.* 1991). The ILO attempts to address these problems by providing specialized training in labor management as one component of the training course. Managing large labor forces on a LB road site demands management skills significantly different from those needed for EB operations. These skills include leadership qualities to organize large groups of human beings, motivate them and control them. Thus, the ILO argues that time and money must be spent on “substantial programs of managerial training” (Hussain 1993:8).

### 2.1.3 The Effectiveness of the ILO Two-pronged Approach

Although the task-rate payment system and the management training have helped contractors manage their labor forces productively, my research demonstrates that the primary indicator of a LB contractor’s performance is the amount of time he spends supervising his site and learning how to manage his labor force after the training program. While large contractors provide little supervision themselves on their sites resulting in poor management, small contractors provide a great deal of supervision on their sites and therefore learn to manage their labor force well. In fact, unlike the large contractors, these small LB contractors have developed their own strategies to increase the productivity of their work force. They actually discard the ILO fixed task-rate system, and raise production by substituting either group work or a flexible

task rate. These small contractors have also developed strategies to mitigate truancy problems on site.

## 2.2 WHY LARGE CONTRACTORS ARE NOT AS SUCCESSFUL AT MANAGING LARGE LABOR FORCES AS SMALL CONTRACTORS ARE

The Ghanaian LB program has accepted many different types of candidates: small house-building contractors, former civil servants, entrepreneurs from other sectors, and some small and large EB road contractors. Of all the participants in the LB program, the large EB road contractors have the poorest record for speed and quality, while the small contractors have been able to manage their sites well. The reasons for this are two-fold:

**First**, not only do large EB contractors have high costs of monitoring because of their size, they also undertake many active projects simultaneously. For example, a large EB contractor may have an ongoing bridge project in one district, an ongoing rehabilitation project some 30 km away and an ongoing maintenance project somewhere else. Large EB contractors choose to work this way because, even though it may seem inefficient, it helps them cope with the common problem of getting paid late. If a payment is delayed for one project, they can transfer, or "swap," payments from another project. This strategy works well when all the ongoing projects are EB because the sites employ only a handful of permanent laborers to operate the machines. This strategy does not work as well, however, when one of the many ongoing projects is LB because LB sites, with their hundreds of casual workers, require a great deal of supervision. Working on several projects at once often results in the contractor neglecting his LB road site. Moreover, if a contractor wins a large EB contract while he is executing a small LB contract, he will focus almost all his attention on the EB site because that is where he will make larger losses or larger

gains.<sup>12</sup> Small firms, in contrast, execute only one project at a time, and, thus, can and do provide their LB site with high levels of supervision; some contractors visit their sites almost every day, and some, three times a week. In fact, the contractor who had the record high for speed of rehabilitation visits his site every day, even though it is difficult to reach from his home.<sup>13</sup> This important aspect of the LB vs. EB calculus is overlooked by ILO and World Bank analysis.

**Second**, large EB contractors have little incentive to learn how to manage labor well because: (i) their equipment holdings make them eligible to tender for large contracts that are barred to small contractors; and (ii) when there are no large contracts available, they can still use their equipment to underbid LB contractors so long as the project site is not too remote. Although, the ILO demonstrated that LB methods were 25% cheaper than EB methods during the pilot project, this figure fails to differentiate between fixed and variable costs. Large EB contractors have high fixed costs and low variable costs, while small LB contractors have low fixed costs and high variable costs; for small contractors, wage payments often account for 40% or more of total cost. Thus, even if LB methods are cheaper than EB methods overall, a large contractor using EB methods can compete with a LB contractor for a small rehabilitation project so long as he can meet at least his variable costs: i.e., fuel, oil, tires, maintenance of equipment, spare parts, and mobilization costs. Unless the site is very remote and the mobilization cost very high, a large contractors who own new or well-maintained equipment will find the variable costs of using EB methods *less than* that of using LB methods. Thus, I argue that because large contractors can be competitive for most small contracts using their equipment, they have little incentive to learn how to manage labor well.

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<sup>12</sup>A contractor can make more profit on the larger EB contract even if it has a lower profit margins than the smaller LB contract. For example, a contractor will make more profit working on a US\$ 3 million EB contract with a 2% profit margin (profit=US\$60,000), than on a US\$ 300 thousand LB contract with a 15% profit margin (profit=US\$45,000).

<sup>13</sup> The only time this contractor does not visit his site is when he is “chasing” a payment certificate.

If large contractors can compete for small projects using their equipment, why then are they signing up to learn LB methods as part of the LB program? Large contractors have shown and continue to show interest in the LB program because it assures them of continuous work for four years (the duration of the hire-purchase repayment schedule) at a time when both large and small EB contracts have become extremely competitive. For example, 17 EB contractors tendered for a contract in the Western region to fill bridge approaches for only US\$30,000. Large contractors' interest in the LB program is only temporary. My research indicates that these large contractors see small LB contracts as only secure "fill in" work and plan to return to EB methods once more EB contracts become available. For all these three reasons, the DFR started to exclude prominent EB contractors from the program in 1988.

For small contractors, the competitiveness of LB vs. EB methods is reversed. Small contractors either own no equipment, and need to rent from the market at high rates, or own old poorly-maintained equipment that frequently breaks down. For these contractors, the variable costs of using equipment will be *greater than* cost of using labor so long as they can manage labor well. Thus, unlike large EB contractors, small contractors have an incentive to learn to manage labor well. This is why they supervise their sites so closely and this is why they have been able to invent innovative strategies for raising worker productivity and controlling truancy on site.

### 2.3 SMALL CONTRACTORS' MANAGEMENT STRATEGIES FOR RAISING WORKER PRODUCTIVITY

The success of small Ghanaian contractors in managing large labor forces can be illustrated by the strategies they have developed on their own to increase worker productivity and to reduce truancy problems on site. These strategies are often improvements on what the contractors learned during the ILO training course and are

fine-tuned through experimentation and innovation on their sites. My research has identified six strategies through which small contractors raise the productivity of their workers. Surprisingly, the first two of them discard the notion of a fixed individual task rate.

**First**, although the ILO assigns each worker individual task rates to avoid freeloading, many contractors have found that their sites function more productively when laborers work on certain tasks in groups rather than individually (See Appendix 3 for a description of tasks). For example, contractors have changed the individual ILO task rate of excavating  $3\text{m}^3/\text{day}$  and assigned it to a group of workers. In addition, one contractor assigns a group of six laborers the task of excavating  $20\text{m}^3/\text{day}$ ; another assigns a group of workers the task of excavating enough gravel to load the tractor-trailer 1.5 times. This makes supervision easier because it is much easier to count how many times the tractor-trailer has been loaded than to measure out  $3\text{m}^3$  of gravel for each laborer (Acheampong, head supervisor). When building scour-checks in the drains to prevent erosion, some contractors assign four laborers the task of building four scour-checks per day rather than assign each laborer one, because "when they work together as a team, they work harder" (Ofori, supervisor). Although the World Bank frowns on group work because it encourages freeloading (Coukis 1983:164), contractors have avoided this by allowing the laborers to form their own groups. "If [one laborer] is lazy, the group will sack [him] or they will prefer to select someone else" (Acheampong, head supervisor). This finding supports other findings in the literature on individual vs. group work. Marriot's (1971) study of two car factories found that small groups of workers who could choose their colleagues had higher productivity than individual piece workers.<sup>14</sup>

**Second**, although the ILO defines an exact task rate for each activity, contractors do the opposite: they make the task rate flexible so that the laborers feel they are being

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<sup>14</sup>A small group consisted of 2-3 workers.

treated fairly. For example, contractors reduce the number of meters a laborer must ditch if he is encountering fused laterite, or the number of cubic meters of gravel a laborer must load onto the trailer if the soil is rain soaked and very heavy. Contractors will also reduce the size of the daily task one set of laborers must achieve if it is being delayed by another set of laborers. For example, contractors will reduce the quantity of gravel the “gravel spreaders” must spread if the “gravel pit laborers” are excavating very slowly and delaying them. Making laborers feel they are being treated fairly is important in raising labor productivity. This issue of how the laborers perceive the contractor is very important and will be raised again in the next chapter.

This practice of making task rates flexible is in conflict with the attempts by the ILO and the World Bank to define an exact task rate for each activity. For example, in his guide to LB construction programs, Coukis presents a sample calculation for setting the task for taskwork (1983:162). This calculation is based upon the average measurements of the man-day output of daily-paid workers and is not meant to be changed by the site managers. Rather Coukis recommends placing the authority to change task rates at the central level.

**Third**, contractors prefer to employ women in order to raise the productivity of certain activities. This is surprising given that many other development programs have had to make special allowances to employ women or have had to convince the private sector participants to hire women against their wishes. In Ghana, however, LB contractors report that women are better than men at removing topsoil with a hoe because “women can bend down and work continuously for one hour without getting up [while] men will try to do [the grubbing] quickly so they can stand up and stretch” (Ofori, supervisor). No one knows why this is true, although some say it may have something to do with women's wider hips allowing them to better tolerate a bending down position. In addition, women are better than men at camber formation—building up the road's profile so that rainwater will run off the road surface into the

drains—because "women are more careful and have more patience" (Tenkorang, contractor). Some contractors have also assigned women to unload gravel onto the road surface because that task requires little physical strength.

These findings argue for a new way of analyzing women's participation in LB works. In the past, researchers and donors spent a great deal of energy trying to prove that there is little or no difference in the performance of men and women (Howe and Bryceson 1993 cite Brudefors 1989 and Scheinman et al. 1989). This implies that Africans view male labor as superior to female across the spectrum of activities. My findings demonstrate that this is not the case and suggest that future research should focus first on identifying those tasks which women perform better than men and then ensuring that women are paid well for these tasks.

**Fourth**, although in the training course, the ILO assigned only men to those activities that required significant physical strength, some contractors have developed innovative ways to combine both sexes on these activities. For example, one Ghanaian contractor assigned women to work with the men on ditching (a task that requires significant strength). In this case, the men do the more physically difficult task of excavating and women do the less difficult task of removing the excavated material. When the task of ditching is divided in this manner, seven men can excavate 140 meters, twice the excavation normally assigned, while only two women are needed to remove the excavated material. Thus, the 140 meters of ditching, which normally would require 14 men, can now be organized so that it requires only seven men and two women.

**Fifth**, although Ghanaian contractors are not allowed to use any hired equipment on their sites unless it is part of the hire-purchase arrangement, a few contractors mentioned that if the program allowed them to use more equipment, they may actually be able to increase the number of laborers they hire. For example, one contractor said he could hire more men to work in the gravel pit if only he had another tractor trailer



to haul the increased quantity of gravel.<sup>15</sup> In addition, contractors have experimented with combining labor and the different machines provided by the purchase-hire arrangement to increase productivity. For example, although the ILO course teaches contractors to use the tipper truck for loading and hauling earth and gravel, many contractors now have replaced the tipper truck with the tractor and trailer because the trailer is much lower and therefore easier to load. One DFR engineer states, "We've stopped using the tipper because it was too high. Throwing material up like that was too difficult." This may argue for greater flexibility in the way a LB program is developed.

**Sixth**, although the ILO approach is built on the Western ideal of employment being contractual and based on a set conditions of service, many contractors increase worker motivation by drawing upon cultural traditions. For example, many contractors bring food to share with the laborers each time they visit the site and give bonuses to their supervisors in the form of gifts, such as cloth or money. Some contractors will even offer to help the workers with their task. This is likely a response to the traditional African setting, where hired labor was used especially for planting and harvesting.

The hired worker was made to feel like a guest who, apart from his wage, was often entertained with food and drink. The farm owner and his family worked with the hired man and showed him gratitude since, as far as the two parties were concerned, the hired man was working for the benefit of the owner. The agreed cash wage was thus only part of the unwritten bargain, gratitude and 'return favors' being an important part of the laborer's remuneration. (Onyemelukwe 1973:115)

The fact that small Ghanaian contractors have developed strategies that are either inconsistent with, or improve upon the ILO approach, demonstrates that labor management is not a principal constraint for small contractors. The first two strategies

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<sup>15</sup> Akessiemi's supervisor says during gravelling, they will sometimes hire another tipper to speed up. Especially when the gravel is far from the road site.

are directly inconsistent with the labor-based approach followed by donors; instead of paying laborers to complete a fixed individual task, contractors: (i) pay laborers to complete tasks in groups and (ii) make the tasks flexible. The third strategy, in which contractors employ women to raise the productivity of certain activities, argues for a new way of analyzing women's participation in LB works. In contrast to current approaches, which try to prove that there is little or no difference in performance between men and women, future research should focus on identifying those tasks—like removing topsoil and camber formation—that women perform better than men. The fourth and fifth strategies, which deal with the mixing of laborers of different gender and the mixing of equipment with labor, represent improvements on the ILO approach: (i) instead of assigning only men to do ditching, contractors can split the task and then assign women to the physically easier part, and men the physically more difficult part; (ii) although Ghanaian contractors are not allowed to use any hired equipment on their sites, contractors may be able to hire more laborers if they have access to more equipment. The sixth strategy contractors use to raise productivity, is contrary to the Western “contract” approach and is rather borrowed from the traditional Ghanaian culture; contractors maintain high worker morale by bringing food to share with the laborers each time they visit the site and giving bonuses to their supervisors in the form of gifts, such as cloth or money.

#### 2.4 SMALL CONTRACTORS' MANAGEMENT STRATEGIES TO CONTROL WORKER TRUANCY

Among the many difficulties contractors experience in controlling workers on their sites, some are specific to supervisors, such as putting non-existent laborers on the payroll, favoring a laborer by reducing his/her load, and quitting. Others are specific to local laborers, such as the reluctance of local villagers to work on the road because the work appears too physically demanding. And finally some difficulties, such as stealing, are found among supervisors and laborers alike. This section presents these difficulties and describes some of the strategies contractors have developed to mitigate them. The

development of these strategies demonstrates that small contractors can control large labor forces well and can therefore make LB methods competitive with EB methods.

#### 2.4.1 Difficulties specific to supervisors

Despite the attention to controlling laborers in the LB literature, contractors have had the most difficulty controlling their supervisors—not their laborers. LB contractors' supervisors are extremely important employees, because contractors live and have offices in the cities, often far from their work sites and employees. Thus, supervisors, the highest level employee on site every day, are crucial for they must oversee as many as 150 employees at one time. For EB contractors, supervisors are not as important because the contractor can identify which of his 10 machine operators is causing a problem or shirking even without his even visiting the site. The supervisor's ability can have a huge effect on the productivity of a LB site. World Bank (1975) studies of road construction in India found that "good" as against "fair" supervision could account for a 33-125% productivity difference, and "good" as against "poor" for 91%. This supports the work of Argyle *et al.* (1958) who found that the type of supervision (i.e., whether general, democratic or non-punitive) had a greater effect on the productivity in departments where an incentive payment scheme did not operate, and work was not machine-paced.

The three types of cheating problems with supervisors that contractors have experienced include: (i) putting non-existent laborers on the payroll, (ii) favoring a laborer by reducing his/her load, and (iii) quitting. In this section, I will first describe each difficulty and then present the strategies contractors have developed to mitigate them.

The first difficulty is supervisors claiming non-existent causal laborers on the payroll and then pocketing their pay checks. The names of these non-existent laborers are

known as "ghost names." Rather than just blatantly adding a ghost name to the roster, supervisors try to disguise them from the contractor by increasing the tasks of those laborers who cannot measure. For example, on most sites, the daily task rate for ditching is 10 meters per day. If a supervisor knows that five of his laborers cannot measure, he can give each of them 12 meters of ditching per day, instead of the normal 10 meters, without their noticing. These five laborers will now complete 60 meters of ditching each day, instead of the normal 50 meters. Thus, there will be 10 meters of ditching completed each day that is unaccounted for. The supervisor can then place a ghost name on the payroll and tell the contractor that the five laborers plus his fictitious sixth laborer completed the 60 meters.

Contractors use three different strategies to reduce this problem. First, contractors visit the site and pay laborers themselves instead of allowing their supervisors to do so. Many contractors described their anger the first time they went to the site, called out the name of each laborer on the payroll, and discovered that many of the names were fictitious. Second, contractors mix "old hands" with "new hands" so that the "old hands" can teach the "new hands" how to protect themselves from being cheated by the supervisor. For example, the "old hands" teach the "new hands" that the shovels and pick-axes are 1 meter long and can be used as a meter-rule to measure task rates. Then, if a supervisor measures out 12 meters of ditching instead of 10, the "new hand" can measure his task, laying his shovel end to end, to see if he is being cheated.

Third, contractors have created a special tier of casual laborers—headmen—to control "ghost names." Most contractors train their headmen to know how to do certain tasks as well, if not better than, their supervisors. Headmen then lead one group of workers (i.e., 10 men excavating in the gravel pit) while continuing to do the same work as the laborers. Supervisors, in contrast, do not do the same work as the laborers because they are responsible for a number of tasks in different locations (i.e., setting out, excavation, and ditching). Thus, if a supervisor increases the workers' tasks in order

to add ghost names to the payroll, the headman's task will also be increased. If the contractor has developed an open line of communication with his headmen, the headman will report the supervisor to him. which, in essence, is a form of "bottom up" monitoring. Mr. Yeboah, a contractor who developed this strategy, maintains "a relationship with the laborers so they feel free to report incidents [by] chatting" with them. Thus, talking with subordinates informally develops worker loyalty and makes workers less afraid to approach the contractor and report untoward incidents.

The second difficulty contractors face is their supervisors favoring a laborer by reducing his/her workload. For example, a male supervisor may take one of the female laborers as his girlfriend and reduce her task at the work site. This behavior affects workers' morale and lowers the firm's productivity. My research has identified one strategy for ensuring that a supervisor does not favor any one laborer. The contractor will calculate exactly what should be accomplished and know which supervisor is supervising each task. Then when he visits the site, the contractor can measure what work has been done and compare it with his calculations, a time-consuming endeavor. If the amount of work accomplished falls short of his calculations, he can punish the supervisor who is responsible. Supervisors have found other means of favoring workers, however, that are acceptable to the contractor. For example, supervisors will assign their girlfriends to easier tasks, such as carrying water. Although this may affect the morale of the female laborers, contractors have found that it does not affect the productivity of the site significantly because, this type of favoritism is culturally more acceptable..

The third difficulty contractors face is their supervisors' leaving the firm because they have either found better paying jobs or do not want to live on site in a rural area. Although this is a problem for all contractors, the loss of a supervisor represents a larger financial loss for a LB contractor because he, unlike his EB counterpart, has directly financed his supervisors' living expenses during the training program. My

research has identified two strategies contractors use to keep supervisors from quitting. First, contractors select supervisors who are from small villages so they will not mind living in a rural area. Second, contractors try to avoid allowing their supervisors to sit idle. Boakye, a contractor in the Brong-Ahafo region, found that when supervisors sit idle, even though they are being paid, they start to feel insecure and begin "shopping for a better-paid job."

Thus, contractors have been able to develop strategies to successfully mitigate the many problems with supervisors. These strategies enable contractors to monitor supervisors by either visiting the site themselves (top-down monitoring), developing a group of "informers" (bottom-up monitoring), or a combination of the two.

#### 2.4.2 Difficulties specific to laborers

Although LB programs are often justified on the premise of creating employment in the areas surrounding the road site, contractors sometimes have difficulties attracting local laborers at the outset of the project. Based upon the experience of the LB road program in Ghana, contractors predominantly draw their labor from the agriculture sector, filling their payrolls with "by day" farm laborers—laborers who are hired by farmers to work the land for one days' pay. "By day" farm laborers earn approximately 1 US\$1/day while contractors only pay US\$0.80 per task (a task is designed to take one working day to complete, so essentially contractors pay US\$0.80 per day). Laborers initially prefer farmwork, not because the pay is higher, but because they feel the road work looks too physically demanding; they consider excavating gravel a much harder physical activity than weeding on the farm. Eventually, laborers prefer road works to working "by day" for a number of reasons including a preference for continuous work with lower pay to intermittent work with higher pay (See Appendix 5 for a comparison of casual wage rates across Africa).

My research identified four such strategies various contractors have developed to make road work more attractive at the outset of a project. First, one contractor reduces the size of the daily task each laborer must complete, so the local villagers gain confidence in their ability to do the work. Subsequently, he slowly increases it (Nimako, contractor). Second, some contractors encourage "old hands" to socialize with the villagers to convince them that the job is not so difficult (Yeboah, contractor). Third, one contractor initially brings food to the site as an extra incentive. He states, "If [a laborer] comes six days in a row, [he] gets two cups of rice." Once the villagers begin coming to ask for work, this contractor stops bringing rice (Ansah, contractor). Fourth, another contractor persuades the chief and villagers that the result of the work "belongs to them" and not to the contractor or to the government. He explains, "We must know how to persuade people to do work...so that the person feels the work he is doing belongs to him." (Owusu, contractor). This particular contractor had worked in the past as a community developer. He feels his past experiences in organizing people to do self-help projects have helped him attract labor for LB road rehabilitation.

These villagers, who were initially reluctant to work for the contractor, eventually prefer road works to working "by day" as farm laborers for several reasons. Villagers prefer continuous work with lower pay to intermittent work with higher pay. Even though in some places "by day" pays more per unit time than road work, villagers still prefer road work because it often lasts a minimum of one year, while "by day" lasts just that—one day. In addition, villagers prefer getting paid monthly while working on the road, rather than daily, because it forces them to save, which they like (Ababio, laborer). Laborers who are paid each day find it difficult to avoid family pressure to spend the money as it comes in. One laborer stated, "If you earn money at the end of the month in bulk, you can save something. If you're paid daily, then you cannot save" (Ababio, laborer). This same laborer used his savings to build a small mud house. In

preferring monthly payment over daily payment, laborers do not consider the forgone interest on their accrued earnings because most informal credit schemes available to them in the villages (i.e., *susu*) also do not accrue interest. Moreover, if a villager works on the road, which is a regular paid job as long as his performance remains high, he may be able to qualify for consumer credit from the Social Security Bank. If he works by day, however, he cannot do so. Thus, villagers prefer road works to "by day" farm labor because the work is more continuous, the payment structure enables them to save, and this type of employment qualifies them for one source of formal credit.

#### 2.4.3 Difficulties common among both laborers and supervisors

The primary difficulty contractors face caused by both laborers and supervisors is stealing. This is not surprising; since many activities that are labor-intensive have this problem (i.e., restaurants). How have road contractors combated this problem? My research identifies two strategies contractors have developed to ensure that a supervisor does not steal materials from the site; both of these play the laborers off the supervisors. First, some contractors let the laborers know they can move up in the company if they work hard and prove their loyalty to the firm. Then those laborers who want to move up in the company, for example "old hands," will prove their loyalty to the contractor by reporting stealing (Yeboah, contractor). In one example, a permanent employee stole cement and then three different laborers at different times approached a contractor to report the incident. Second, some contractors tell their laborers that if materials are stolen, the laborers will be blamed for it and dismissed immediately. Thus, if a supervisor steals material, the laborer will have nothing to lose by reporting the supervisor.



Contractors have also developed a strategy to control for casual laborers stealing the tools (cutlasses, pick-axes, shovels, head pans and rubber boots): a payment system that requires the laborer to show his tools before he is paid (Tenkorang, contractor). Obetsebi, a contractor in the Brong-Ahafo region, allows his laborers to keep their tools even when they go home after finishing their task, but when they come for their pay at the end of each month, they must "deliver the tool." This system has decreased the incidence of stealing on his site. In addition, contractors have developed a number of strategies for making the site run more smoothly in general. Contractors will hire one supervisor who is responsible for overseeing the other supervisors. Contractors will also hire relatives who are loyal to the firm and do not feel intimidated to report other supervisors who are cheating.

The findings presented in this section argue for a new and different framework from which to examine the relative costs of LB and EB rehabilitation. They suggests that the relative cost of EB works compared with LB works varies with the size of the firm, including the quantity and condition of all equipment owned. Those contractors who have large firms manage labor poorly and have a low level of performance. Small firms, in contrast, have demonstrated that they can manage labor well through the many innovate strategies they have developed.

### **3. SMALL LB CONTRACTORS VS. SMALL EB CONTRACTORS: DO DELAYED PAYMENTS FAVOR ONE METHOD OVER THE OTHER?**

If pay is prompter, I would use the labor because a grader is more expensive (maintenance, fuel consumption, spare parts). If they don't pay promptly, I'd rather use the grader because it would reduce my headaches with labor. (Yeboah, contractor)

#### **3.1 INTRODUCTION**

If small Ghanaian contractors can successfully raise labor productivity, as I am arguing, why do so many of the small contractors want to leave the LB program? The evaluations of past projects offer few answers to this question. Before 1986, government road agencies were responsible for all aspects of rehabilitation and management in Africa; hence, the literature on private contractors, as opposed to government, using LB road methods Africa is scant. One of the few articles found evaluates ILO experience with small-scale contractors in Ghana, Madagascar and the Philippines; this article argues that the major constraints to small contractors using LB methods, have to do "with the general problems faced by [all] small-scale contractors" (Edmonds and de Veen 1992:102)—namely, obtaining credit, operating within very demanding contractual regulations, and being paid on time. This chapter will focus exclusively on the last problems—being paid on time—because although the ILO created a mechanism to ensure timely payments during the pilot stage, this mechanism was temporary, and delayed payments once again became common in the program phase.

Late payments are an inherent part of the road construction industry because many road building agencies in Africa award contracts without ensuring that the required funds will be available, and have highly centralized and bureaucratic payment procedures (Edmonds and Miles 1994:47; Ofori 1991). In Ghana, for example, central

government payments have been delayed as long as six months. Edmonds and de Veen state that the problems facing contractors, including the problem of delayed payments, "remain the same whatever the technology" (1992:102).

The research I conducted in Ghana challenges this last statement. My findings demonstrate that delayed payments do not affect LB contractors and EB contractors equally because, in Ghana—unlike in most of Africa—small contractors can obtain credit from suppliers without paying interest and can pay suppliers late. Thus, payment delays cause small contractors to favor EB methods over LB methods, and hence undermine the very objective of LB programs. When payments are timely, as they were during the pilot phase of the ILO program, LB methods proved cheaper per km and more competitive than EB methods for small firms (Appendix 6). When payments are delayed, however, LB firms are unable to pay their laborers and strikes result, while EB firms are able to pay their machine operators and suppliers late if they themselves are paid late.

This section of my thesis compares the obligations faced by a LB firm to those faced by an EB firm and explains how these differences cause small LB firms to be more sensitive to delayed payments. In so doing, this section addresses the following questions: (1) What happens when delayed payments occur on a labor-intensive road site? (2) What strategies have LB contractors adopted to mitigate the effects of delayed payments? In addition, I discuss the differences in payment procedures used by the central government and district-level government because my findings suggest that, in contrast to central government, the district-level government surprisingly pays contractors on time. As part of its decentralization program, Ghana assigned certain responsibilities to the districts, including administering civil works contracts up to US\$250,000 (as opposed to US\$500,000 at the regional level). At the time of my research, many LB contractors who had executed rehabilitation contracts as part of the LB program had also executed some small road works (i.e., routine maintenance

contracts) for the districts. In this chapter, I propose three reasons why the district government makes more timely payments to contractors than the DFR head office does.

### 3.2 WHY SMALL LB CONTRACTORS ARE MORE SENSITIVE TO DELAYED PAYMENTS THAN ARE SMALL EB CONTRACTORS

One must examine a firm's obligations to understand why delayed payments have a greater effect on LB contractors than EB contractors. This section will demonstrate that, although both types of contractors have similar obligations to suppliers and permanent laborers, it is only LB contractors who have obligations to casual laborers, and this difference makes them more sensitive to delayed payments.

The literature often states that "suppliers will only consider credit arrangements for well-established firms" (Edmonds and Miles 1984:69). My findings in Ghana, however contradict this statement. I found that, in Ghana, suppliers operate in a "buyer's" market. This type of market, which is very unusual in most of Africa, is the results of a large number of Ghanaian sellers all competing for the patronage of a few buyers. Suppliers compete with one another by offering contractors special rates, credit without interest, and "understanding" when contractors' payments are delayed. Thus, both large and small road contractors can get credit from suppliers of machinery, cement and fuel even if they have constrained access to formal credit. For example, in Kumasi, a small LB road contractor can buy as many as 200 bags of cement on credit (Tenkorang, contractor). Mrs. Akessiem, the wife of another small LB contractor, says she and her husband buy everything on credit from suppliers including "the tires for the tipper trucks." She attributes their ability to get credit from suppliers to their having "built a trusting relationship" with the suppliers.

Not only will suppliers provide contractors with materials on credit; more important to my argument, they will also accept late payments if the contractors' payments are

delayed. For example, one contractor said he merely had to go to his suppliers and explain; if he has known the supplier for a long time, he can just send a note (Mrs. Akessiemi, supervisor). Even if the supplier is not sure he should trust the contractor, he can always verify the contractor's statements. For example, if a contractor rents a machine from a plant pool, the pool supervisor can check around the DFR to see if it is indeed true that the contractor has not yet been paid (Yeboah, contractor).

If both LB and EB contractors can delay payments to suppliers when government payments are delayed, why then are LB contractors more sensitive to late payments than are EB contractors? The primary factor distinguishing the effects of delayed payments on the two kinds of contractors is the differences in the types and quantity of labor these contractors employ.

LB contractors employ mostly casual laborers, who demand timely monthly payments because they do not trust the contractor. EB contractors, in contrast, employ permanent laborers who will accept delayed payments even as much as one month late because they trust the contractor. This trust is developed because the contractor provides his permanent laborers with health insurance, and often provides them with loans. In Ghana, a permanent employee expects to remain with the firm as long as it survives. This relationship between the permanent staff and the contractor discourages permanent laborers from leaving their jobs just because their payments are sometimes delayed. As one contractor explained, when laborers are permanent, "They're not as demanding that you pay on time. Permanent laborers know you more" (Obetsebi, contractor).

Unlike a supplier, neither a permanent nor a casual laborer can verify the contractor's claim that the payment from the government is delayed. As one contractor explains, "The laborers cannot come to Accra to see if you haven't been paid" (Yeboah, contractor). The difference, however, between a permanent and casual laborer is that

a permanent laborer will trust the contractor's claim while a casual laborer will "feel you've stolen the money" (Yeboah, contractor). In one instance, one small LB contractor who had not been paid was able to pay his casual laborers by raising outside financing (i.e., borrowing large sums of money from family). This caused the laborers who were working for the other small contractors to grow suspicious that their contractor had been paid and had pocketed the money.

LB contractors differ from EB contractors not only in the type of labor they employ, but also in the number of laborers they employ. LB contractors employ as many as 150 laborers per gravel road as compared to about 10 for EB contractors. This multiplies the problem for LB contractors, who must pay five times as much in wages to their employees as an EB contractor.<sup>16</sup> In addition, because EB contractors employ few workers, in times of emergency, they are able to get enough bridging finance to at least pay each worker something. For example, the overdraft limit for both small EB and small LB contractors at the Sunyani Bank for Housing and Construction is US\$100.<sup>17</sup> If both these contractors were to get an overdraft for US\$100, the EB contractor could then pay each of his 10 employees US\$10 for the month (approximately 30% of their normal monthly salary),<sup>18</sup> as compared with the LB contractor, who could only pay each of his 150 laborers about US\$0.65 until he receives payment. This is not even one day's wage!

When a LB contractor's payments are delayed and he cannot pay his casual laborers, they either stop coming to the site or else they strike. When payments are timely, LB contractors complete one km of gravel road at 3/4 the speed and 3/4 the cost of an EB

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<sup>16</sup>LB contractors pay out an average of 2.5 million cedis per month to all their employees while EB contractors pay only an average of 0.5 million per month to their employees.

<sup>17</sup>Sunyani Bank for Housing and Construction's overdraft limit is 100,000 cedis and, at the time this research was conducted, 1000 cedis could buy US\$1. The National Investment Bank's overdraft limit is 60,000 cedis. To get more money than what comes in the overdraft, one needs securities and one also needs to file 6 months in advance. Thus, one cannot get a loan fast! (Tenkorang, contractor)

<sup>18</sup> Although a grader operator (one of the most highly paid employees in an EB firm) would normally receive around US\$35 per month, US\$10 should be enough to tide him over until the contractor is paid.

contractor. Since the creation of the LB program, contractors have been paid for work completed based upon DFR engineers estimates, and not tendered prices. Therefore, since payments are fixed at a precise amount, profit can be determined to be the total payment for the completed works minus the cost of the completed works. Given the rate of completion and the cost of LB vs. EB works, a LB contractor will make approximately seven times as much profit per month than an EB contractor<sup>19</sup> (Appendix 6). But if payments are delayed and the speed of LB rehabilitation falls, the net present value of the contractor's profit will fall. If the speed of rehabilitation at the LB site falls below a certain threshold, EB methods becomes more profitable than LB.

In addition, it is more difficult for a LB contractor to recover from delays or stoppages than it is for an EB contractor to do so because delayed payments damage the tenuous relationship of trust between the contractor and his casual laborers. "Once you have cash flow problems....the laborers don't have confidence anymore so they won't come back to work for you" (DFR engineer). In contrast, delays or stoppages for EB contractors are primarily due to machine breakdowns; a problem a contractor can repair without having to rebuild "confidence."

### 3.3 CONTRACTORS' STRATEGIES FOR DEALING WITH PAYMENT PROBLEMS

LB contractors have developed a number of strategies to deal with payment problems. These strategies help contractors (i) speed up government payments; (ii) keep the site moving when payments are delayed; (iii) reduce worker discontent by paying laborers in a particular order when the contractor does not have enough to pay all in full; and (iv) handle strikes.

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<sup>19</sup>I am using profit per month as a substitute for a discounted cash flow analysis. Calculations assume this payment equals the cost of building one km of road using EB methods plus 10% profit.

### 3.3.1 Speeding up Government Payments

Contractors employ two strategies to speed up government payments. The first is to "chase" the certificate which they use to claim payment, to accelerate the payment process. In other words, contractors will personally bring the certificate to each of the required 13 government officials to sign rather than rely on the mail. The second strategy is to use their association (LABCA)<sup>20</sup> to press DFR to release the money (Mrs. Akessiem, supervisor). In one instance, LABCA reported a case of delayed payments to the newspapers and, once government officials saw it in print, they released the money.

### 3.3.2 Keeping the Site Moving when Payments are Delayed

Contractors have developed two strategies to keep the site moving when payments are delayed: (i) hiring a number of "old hands"; and (ii) trying to build trust with the "new hands." Contractors hire "old hands" because they will work in spite of delayed payment. When payments are late, the "new hands" stop coming to the site, while the "old hands," who can make up as much as 30% of the casual labor force, continue to come. This formation of a special, and in a sense, permanent, class of casual laborers called "old hands" is a phenomenon only seen among LB contractors. Although most LB contractors have completed at most three contracts, "old hands" have become a very important tradition.

Why are "old hands" willing to accept late payments? They do so either because they wish to learn a trade or because they are trying to move up in the company to a more

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<sup>20</sup> The ILO encouraged contractors to form LABCA at the end of the pilot project.



permanent position such as headman, supervisor, or machine operator (Yeboah, contractor). If an "old hand" is trying to learn a trade, such as masonry, he will follow the contractor from site to site so he can continually work with the concrete gang. If the "old hand" is trying to be promoted, the typical pattern of promotion is to start as a casual laborer (US\$19/mo.), move up to headman (US\$19/mo.), then finally become a roller operator (US\$19/mo.), tractor operator (US\$24/mo.) or supervisor (US\$35/mo.). In one firm, one of the supervisors and all the machine operators (excluding the tipper operator) started as laborers.

This drive to be promoted makes "old hands" so loyal to the firm that when local laborers stop working, fresh "old hands" will migrate to the area to take their place (Yeboah, contractor). These fresh "old hands" will often be laborers who initially missed their opportunity to follow the contractor to his new site. Even though they often have no relatives or support network around the contractor's new site, they will accept delayed payments from the contractor and make ends meet by working as day laborers on the weekends and/or by getting contracts to weed someone's farm. Some "old hands" are so important to the firm that the contractor will pay for their transportation to the new site and for their accommodations. This reciprocal relationship between "old hands" and the contractor is crucial to the firm's survival.

The other important strategy contractors have to keep the site moving when payments are delayed is building trust with the "new hands." This is done by giving local laborers the perception that the contractor is an honest man. "Old hands" help create this perception by assuring the "new hands" that the contractor is a good man. Contractors can also create this perception themselves. For example, they allow casual laborers to keep the firm's tools until they are paid. As two contractors said, "We allow them to keep the tools with them while they are doing a task. If we are not paying, then we have no right to collect the tools" (Tenkorang, contractor; Obetsebi, contractor). In addition, contractors change the payment incentive structure if the

laborers feel it is cheating them. For example, contractors in the Ashanti region discarded the bonus system that they learned in the ILO course because the workers felt it cheated them. The bonus system works in the following way: if a laborer is continuously present for 6 working days and accomplishes his tasks, he will be paid 8 days' wages. If he is present for 4 weeks and completes his task each day, he earns an extra 6 days' wages. Thus, a worker who accomplishes his task on all working days of the month can attain a maximum bonus of 45% of the monthly wage (Osei-Bonsu 1992). The laborers in the Ashanti region felt this system cheated them because they did not see why one laborer should receive a bonus when another did not. This supports the work of Davison (cited in Horton and King 1981) who found that incentive payments increase tension in social relations because they underscore the differences in workers' earnings and foster ill feelings.

### 3.3.3 Paying Laborers in a Particular Order

Contractors have also developed a strategy to reduce worker discontent when the contractor does not have enough money to pay all workers in full: they pay the casual laborers first, headmen second, supervisors third, and suppliers last. As discussed before, when paying off debts, the contractor pays first the people with whom he has the least trusting relationship and then moves across the spectrum toward the people with whom he has the strongest (Yeboah, contractor).

### 3.3.4 Handling Strikes

Contractors have developed strategies to handle strikes. For example, they promote the laborers' "natural leaders" to management positions. For example, one contractor found that his laborers organized around the natural leaders. When payments were

delayed, it was these leaders who called the strike. This contractor stripped these leaders of their power by promoting them to salaried positions where they could get advances and would receive bonuses based upon the firm's profits. Once he did so, these leaders "realized they were different from the other laborers" (Tenkorang, contractor). Another strategy contractors have developed is to encourage "old hands" to talk with the "new hands" and end the strike or else report the strike leaders to the contractor.

### 3.3.5 Last Resort

Contractors have a last resort strategy to deal with delayed payments— leaving the LB program entirely. Many contractors expressed an interest in leaving the program if payments continue to be delayed (Yeboah, contractor). However, many contractors are again feeling enthusiastic because Denmark is planning to fund some LB roads. Contractors feel that payments will be timely when a donor directly controls the funds for LB rehabilitation (as during the pilot phase of the ILO program), in contrast to when donors allow the national government of Ghana to control the funds for LB rehabilitation.

## 3.4 CENTRAL VS. LOCAL GOVERNMENT AND TIMELY PAYMENTS

Based on evidence from one district, the more decentralized branch of government paid contractors who executed maintenance works on time.<sup>21</sup> My research identifies

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<sup>21</sup>The district tendering system: Tendering at the district level is carried out by a board comprised of six to eight members. The district secretary (now called the district chief executive) is the chairman of the board. After being appointed at the national level, he must be receive a 2/3 majority vote by the district assembly to stay. The district administrative officer, a civil servant, is the secretary of the board. The remaining members of the board include the presiding member of the district assembly and an official from the public works department. The former is elected by the assembly members who, themselves, are elected by

three reasons why the district government makes more timely payments to contractors than the DFR head office does. The first reason—that rural road works have higher political payoffs at the local level than at the central level—is universal. The second reason—that districts in Ghana receive grants from the central government for road works before contractors tender for and execute the works—is idiosyncratic and can be attributed to conditions laid out in the World Bank’s National Feeder Roads Rehabilitation and Maintenance Project. These reasons are discussed below.

**First**, rural road works universally have higher political payoffs at the local level than at the central level. This is especially true for certain maintenance activities, such as filling gullies, because these activities can mean the difference between a passable and an impassable road during, and immediately after the rainy season. A passable road is essential for connecting a village with hospitals, banks, post offices and markets; thus, there is almost no other activity at the local level that can divert funds and attention from making rural roads passable. At the national level, this not the case; funding for rural road works is often diverted to paved roads (Tendler 1979a:42). Thus, because rural road works receive much higher priority in the local budget than they do in the central budget, contractors working on rural roads have a better chance of being paid on time at the local level than at the central level, where their funding may be diverted to other activities.

**Second**, unlike the DFR head office which does not control the funds used to finance the works done by contractors, the districts receive grants from the central government covering 100% of the estimated costs of routine and recurrent maintenance before the works are tendered and executed. This financial arrangement, which is unusual for countries in SSA, is supported by the World Bank's National

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the communities in the electoral areas. The chief engineer from DFR sits on the tender board but is not a member; he is just there to give technical advice. The DFR designs the contracts to be awarded. The district can award routine maintenance contracts up to 250 million cedis maximum. As the districts' capacity increases, they will be allowed to award larger contracts, including rehabilitation contracts.

Feeder Roads Rehabilitation and Maintenance Project (World Bank 1991:12). The DFR prepares detailed cost estimates comprising all maintainable feeder roads in each district, and then the central government, after performing a thorough assessment, transfers funding to the districts. In other words, the districts receive money for civil works before contractors tender for and execute the works, rather than as is customary, after a contractor tenders for and executes the works. The DFR head office, in contrast to the district, is at the mercy of financial and administrative constraints outside its control; all payment certificates have to pass through the Ministry of Finance office in Accra before payment can be made (Edmonds and Miles 1994:59). Thus, in contrast to the districts, the DFR head office receives money for rehabilitation only after contractors tender for and execute the works. In addition, because districts have the money in hand to pay for works completed, the contracts administered by districts have a more streamlined payment method than those administered at the central level. The close proximity of the district administration to the actual road work means contractor's interim payment certificates must pass through fewer levels of vetting before being paid. The central government, in contrast, will pay a contractor only after his interim payment certificate is vetted and signed by at least 12 government officials: two at the local level, three at the regional level, four at the central office of the DFR, and three at the Ministry of Roads and Highways. This process can delay the collection of claims as long as four to six months (Nti, contractor).

These cumbersome procedures derive from the central government's distrust of local government officials and thus represent a complex web of vetting to discourage local and regional government officials from overpaying contractors (Edmonds and Miles 1984:47; Gaude and Watzlawick 1992). The results however are just the opposite: rather than building accountability into the system, these procedures provide opportunities for bribes or “dashes.” For works carried out for the central level,

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"dashing" can go as high as US\$150 per payment certificate, no matter the size of that certificate. At the local government, "dashing" also exists but the "dashes" do not add up to as much money because payment certificates require fewer endorsements.

These findings indicate that local contract administration in Ghana is more favorable to the use of LB methods than is centrally controlled contract administration. Partly, the political importance of making rural roads passable causes the district level to give it higher priority in the budget than the central level does; and, at the same time, the districts receive money for civil works before contractors tender and execute the works while the DFR head office receives money for civil works after works are executed. This financial arrangement not only enables the districts to pay contractors on time, but also enables them to administer the contracts in a more streamlined fashion. Thus, many LB contractors feel "every region would be better off" if contracts were administered locally (Yeboah, contractor).

#### **4. CONCLUSIONS: LESSONS FOR FUTURE LABOR-BASED PROGRAMS**

There are many lessons to be learned from experiences with LB programs in SSA. Although these programs have the potential to create employment in the rural areas and have been shown to be financially competitive with EB methods, both governments and private contractors have been adverse to using them. This thesis has attempted to understand why this has been the case.

Chapter 1 identifies five reasons found in the literature explaining why government officials have preferred EB methods to LB ones. EB methods can: (i) rehabilitate gravel roads faster than LB methods; (ii) meet much high engineering standards than LB methods; (iii) minimize management problems because they require only 1/15 as many employees per km of gravel road as LB methods; (iv) offer greater political benefits in an election year because equipment can be quickly mobilized than labor to do work for key government supporters, and (v) command more funding than LB methods when donors finance only the foreign exchange costs of a project.

Although much is understood and written about why governments themselves have been averse to using LB methods, the reasons why private contractors have been reluctant to use LB methods has remained elusive. Since the mid-1970s, LB methods have been proven financially competitive using unit-rate cost comparisons of EB and LB methods. Why then are contractors averse to using such methods? My findings show that, although LB methods are financially more attractive for many contractors, market-structure conditions can thwart their use. Unit-rate cost comparisons, therefore, while an important tool for comparing LB and EB methods, are insufficient for predicting firm behavior.

Instead, my findings propose a new “market”-based framework from which to examine this issue: I argue that the financial competitiveness of LB versus EB methods actually vary with two factors. **First**, it varies with the size of the firm. Small contractors are capable of providing their LB sites with a great deal of supervision; their small size enables them to directly supervise their sites and compels them to execute only one project at a time. Moreover, small contractors have a great incentive to use LB methods; for them LB methods avoid the high costs of renting equipment and/or repairing their own old or poorly maintained equipment. Large EB firms, in contrast, are incapable of providing their LB sites with much supervision because their large size increases their costs of monitoring; and, they undertake many active projects simultaneously. Moreover, large EB firms have little incentive to use LB methods; if there is a lull in large contracts, they can still use their equipment to underbid LB contractors for less-remote rehabilitation contracts. Large contractors have access to efficient equipment and thus have lower variable costs than LB contractors who must pay 40% or more of their total costs in monthly wages.

If large contractors can underbid LB contractors using EB methods, why then are they interested in participating in the LB program? The LB program is attractive to them because it promises its participants continuous work for four years or the duration of their equipment loans. For large EB contractors, participating in a subsidized training course is a small price to pay for continuous work at a time when the market for civil road works has become extremely competitive.

**Second**, in a “buyer’s” market where contractors can obtain supplies on credit without paying interest and pay suppliers late, the competitiveness of LB versus EB methods will vary with the promptness of government payments. As Chapter 3 demonstrates, when government payments are prompt, as they were during the pilot phase of the Ghanaian LB program, LB methods proved cheaper per km and more profitable than EB methods. If government payments are late, however, LB methods become more



costly than EB methods even in countries, like Ghana, with low casual wage rates (below US\$1/day). Late government payments fall more heavily on LB contractors because they result in a delay of payment to workers, which cannot be postponed, as opposed to a delay of payment to suppliers.

This evidence—that the financial competitiveness of LB methods compared with EB methods varies with the size of the firm and the promptness of government payments—represents a quite different explanation for contractors aversion to LB methods than that generally given. Previous research attributed this aversion to two factors: contractors being accustomed to using EB methods; and contractors viewing the cost of managing labor as making LB methods uncompetitive (Sadli 1974; Hirschman 1958; de Veen 1994). My findings challenge these explanation. They suggest that the importance of training may be overrated. Although the ILO attempted to assist contractors by providing management training and a new payment system for laborers, small Ghanaian contractors have learned to manage their labor force after the training program and have discarded the ILO payment system for certain activities. In addition, my findings show that the cost of managing labor does makes LB methods uncompetitive with EB methods but only for large firms. Small firms, in contrast, are quite good a managing labor; they have even devised their own strategies to increase worker productivity and to control truancy problems as Chapter 2 demonstrates. My research also adds a new dimension to the literature on small and medium enterprise development. Although this body of literature posits that for the promotion of small firms, LB methods “make sense” because these methods require low capital investment (Lantran 1990), my findings turn this statement around. Instead, I posit that for the promotion of LB methods, small firms “make sense” because only they have the capability and motivation to provide a great deal of supervision to their sites.

My findings from Ghana suggests three recommendations that can be applied to LB programs in other countries: **First**, rather than comparing LB and EB methods using

unit-rates, program promoters should use a “market”-based framework to predict whether private sector firms will adopt LB methods. Before launching a LB program, program promoters should analyze the quantity and quality of equipment holdings for both large and small road contracting firms, and the competitiveness among contractors for all categories of work. This analysis should help determine whether EB contractors will compete with the LB contractors for small less-remote rehabilitation works. My findings suggests that this will be the case if two conditions hold: (i) the large contractor is experiencing a lull in work (due to either an increase in the number of competitive firms or a decrease in government’s budget for road works); and (ii) he owns efficient equipment and thus can meet at least his variable costs. Launching a LB program at a time when there is little work available for well-equipped contractors may be unwise; LB contractors will only survive if they are protected from such contractors and this implies a higher cost per km of rehabilitated road. Thus, protecting LB contractors from well-equipped contractors “develops” the use of LB methods at the tax-payers expense.

**Second**, rather than focusing on teaching contractors how to manage labor, program promoters should primarily focus their attention on developing an enabling environment in which small contractors can operate; i.e., altering minimum wage requirements to reflect the market wage, winning acceptance for task-rate payment schemes, providing small firms access to credit, and reducing the bias against small contractors in standard tender documents. Training small contractors in labor management is of secondary importance since small contractors will “naturally” tend toward labor-based methods and develop their own labor management strategies.

**Third**, in countries where government payments are habitually late, program designers should consider finding alternative institutional arrangements for paying contractors. In the past, donors (from countries such as Switzerland, Canada, USA, Norway, Denmark, Sweden) have addressed the issue of late government payments only in the

pilot project; they have enabled the project engineer to release funds directly from a special account without vetting at district and regional offices, sometimes even providing advance payments for labor. This solution is only temporary and, therefore, represents a significant error, since planners have disregarded one of the main difficulties of encouraging small contractors to use LB methods.

Alternative institutional arrangement for paying contractors on time are many. One is to administer and pay contracts at the district level. Based on evidence from one district in Ghana, contractors who executed maintenance works for the district were paid on time. As a caveat, fiscal decentralization will only be successful if: (i) there is capacity to administer contracts at the district level, and (ii) the district level is monitored by the central level ex-post. If the district level is monitored ex-ante, decentralization may merely create yet another step for payment certificates to pass through before they are paid out. A second alternatives is to set-up a social investment fund similar to AGETIP—a contract management agency run by a non-governmental agency in Senegal—which ensures the flow of donor funds to local level contractors in a timely fashion (Lantran 1991). A third alternative, currently being developed by the South Africans, is franchising.<sup>22</sup> In this arrangement the franchiser can play a role in defraying the costs of delays in government payments (Emery, Alli and Veldman 1994).

This paper supports the use of LB methods for gravel road rehabilitation. Not only can these methods create fifteen times more employment than EB methods, but under

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<sup>22</sup> In the franchising approach, a large contractor or material producer will franchise a part of the business to a small black contractor. COLAS, a bitumen manufacturer, is interested in this model. They intend to provide capital and training to small black contractors in exchange for these contractors exclusively using their product. In a franchising approach, the franchiser takes an interest in the success of the franchisee providing it with working capital and technical assistance. Thus, the success rate for franchised firms is often higher than that for firms in a freely competitive market.

certain circumstances, they can promote private sector delivery. The key concepts which have emerged from this research in Ghana are two-fold: small contractors manage large labor forces much better than large contractors do; and, in a “buyer’s” market, small contractors using LB methods are more sensitive to payment delays than small contractors using EB methods. If the government does not pay small LB contractors on time, they cannot survive. Thus, my findings indicate that, although program promoters focus predominately on training, the success of LB programs actually hinges on paying contractors promptly and addressing market structure problems.

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## APPENDICES

### APPENDIX 1: List of the Firms Interviewed and Information on Other Interviews

#### EQUIPPED LABOR-BASED CONTRACTORS

	Company Name	Region	Interviewee	Title
1	Old Days	Ashanti	----- William Mensah Adua Gifty Ester Nima	Contractor Supervisor Casual Laborer Casual Laborer
2	Knatto Complex	Ashanti	Benjamin Arthur Charles Nyanko Two Men	Contractor Supervisor Casual Laborers
3	Bruku Engineering	Brong Ahafo	Emmanuel Boateng	Contractor
4	Sakyi Contracts	Brong Ahafo	Mr. Sakyi Mr. Aryee	Contractor Head Supervisor
5	Benswap Ltd.	Brong Ahafo	Frederick Obeng Phillip Amoako James Assem Richard Takyi	Contractor Supervisor Supervisor Casual Laborer
6	Essah Asamoah Ltd.	Brong Ahafo	Mr. Mensah	Contractor
7	Donyinah Construction Works	Brong Ahafo	Mr. Donyinah Asuming Addo John Ayertey	Contractor Supervisor Casual Laborer
8	Bekel Ltd.	Western	----- Isaac Yeboa Kwabena Asante Hansen Baafi Charles Amoah	Contractor Head Supervisor Supervisor Supervisor Casual Laborer
9	Gabasan Construction Works	Western	Gabriel Antwi-Boasiako Golly Antwi-Boasiako Dan Fuller Dapaah Danso Agyemang David Nyamekye	Contractor Supervisor Director Head Supervisor Casual Laborer
10	OPM Construction Works Ltd.	Western	Opoku Mensah	Contractor
11	Lidra Construction Ltd.	Northern	Aliu Mahama Abubakari Jomo Adam Adisheita Azara Mahama	Contractor Supervisor Casual Laborer Casual Laborer
12	Savanna Construction Ltd.	Northern	S. Mahama	Contractor
13	A. Nagesten Enterprise Ltd.	Eastern	Alfred Tetteh	Contractor

## NON-EQUIPPED LABOR-BASED CONTRACTORS

	Company Name	Region	Interviewee	Title
1		Eastern	Joseph Hewton	Contractor
2	Borasco Ltd.	Western	Victor Cobbold	Contractor

Most of the contractors in the program were selected by the DFR on the basis of their firm's experience, manpower, and financial status.<sup>23</sup> Surprisingly, during the ILO pilot phase of the program, the DFR encouraged a few entrepreneurs to participate who did not have firms at that time. These men were admitted because the DFR was having difficulty attracting contractors from the road and building industry.

## INFORMATION ON OTHER INTERVIEWS

Within the DFR, I interviewed engineers in three of the five regions where equipped contractors operate. In addition, in Accra, I interviewed the DFR deputy director, the DFR chief quantity surveyor, and a former DFR engineer who helped set up the training course in Sefwi Wiawso.

My findings on payments at the district level of government are derived from interviews in the Western region. These included an interview with an opinion leader at the district level and one interview in each of three different villages that had had their gravel road rehabilitated under the ILO pilot phase of the LB program in the mid-1980s. In both Durowaakrom and Fawohoyeden, I talked with villagers; in Nsuaonsua, I spoke with the chief, the district assemblyman and some villagers who

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<sup>23</sup> To measure a firm's experience, the DFR requested all applicants to submit the name of client, the contract sum, and contract period for all contracts undertaken in the last three years. To determine a firm's manpower, the DFR requested the following information: (i) a list of all permanent management staff; (ii) a list of permanent non-management staff (such as surveyors, draftsman, artisans, operators, office staff); (iii) a list of part-time management staff (such as accountants), and; (iv) a list of the number of laborers employed on each contract undertaken in the last three years. To assess a firm's financial status, the DFR requested each firm to submit audited accounts for the past three years including the following information: indebtedness; description of property; outstanding mortgage; total owing to outstanding creditors, and; value of capital assets including vehicles and equipment.

had worked on the road when it was rehabilitated in the late 1980s. Documentation sources include ILO proceedings, World Bank reports, and reports prepared by the DFR. These are listed in the Bibliography.

## APPENDIX 2: Financial Cost Projections for Equipment and Labor-based Construction of Rural Roads

Equipment-based Construction			Labor-based Construction	
Component	Details	Approx. cost (\$/km)	Details	Approx. cost (\$/km)
<u>Labor</u>			<u>Labor</u>	
Unskilled	100 man-days @ \$1/day	100	1,000 man-days @ \$1/day	1,000
Skilled	150 man-days @ \$2/day	300	200 man-days @ \$2/day	400
Local Supervisory	25 man-days @ \$2/day	50	50 man-days @ \$2/day	100
<b>Subtotal</b>		<b>450</b>		<b>1,500</b>
<u>Tools and Equipment</u>			<u>Tools and Equipment</u>	
Tools, minor equipment	Hand tools, wheelbarrows, etc.	150	Hand tools, wheelbarrows, etc.	250
Major equipment	Graders, dozers, rippers, trucks	2,750	Trucks, tractor/trailer, etc.	750
<b>Subtotal</b>		<b>2,900</b>		<b>1,000</b>
<u>Materials</u>			<u>Materials</u>	
Culverts		600	Culverts	600
Others		200	Other	200
<b>Subtotal</b>		<b>800</b>		<b>800</b>
<u>Site overhead</u>		<u>200</u>	<u>Site overhead</u>	<u>200</u>
<b>Total</b>		<b>4,350</b>		<b>3,500</b>

Note: The following assumptions are made about road characteristics:

*Width:* 4.00 m (+ 1.5 m x 2 shoulders)

*Maximum grade:* 10 percent

*Minimum horizontal radius:* 15m

*Culverts/km:* 1

*Earthworks excavation/km:* 3,000 cu. m (max)

*Earthworks haulage distance:* 150 m (average)

*Surface:* 80 percent earth; 20 percent gravel

*Bridges/km:* 0.25

*Anticipated traffic:* 10 vehicles per day

*Project size:* 100 km

Source: Coukis, Basil. 1983. Labor-based Construction Programs: A Practical Guide for Planning and Management. Washington, DC: World Bank. Page 32.

### **APPENDIX 3: Rehabilitation Procedures from the DFR, Accra**

The labor-based contractor's work is divided into operations which are then subdivided into activities. The main activities are:

- 1) Setting Out. Since the roads being rehabilitated are normally existing roads, the contractor performs setting out using ranging rods and pegs along the old alignment.
- 2) Bush Clearing. Laborers clear the bush using cutlasses.
- 3) Grubbing. Laborers perform grubbing, which is the removal of top soil and roots from the earth, using hoes.
- 4) Tree and Stump Removal. Laborers fell trees and remove stumps using axes. They also use a chainsaw where appropriate.
- 5) Gully Filling and Raising Low-lying Areas. Laborers fill gullies and potholes using material found along the side of the road. If material must be hauled, laborers do so using a wheelbarrow and head pans depending on the distance. Laborers then use a hand rammer or roller to compact the hauled material in the gully or pothole.
- 6) Ditching and Sloping. Laborers excavate the ditches using pick-axes, mattocks and spades (descriptions of these tools can be found in Coukis 1983, Appendix C). Laborers excavate trapezoidal drains, instead of the traditional V-shaped drains, due to the advantages in hydraulics. For example, heavy rainfall will cause less erosion to a trapezoidal drain than a V-shaped drain. Laborers and supervisors use a ditch template to check the uniformity of the drains excavated.
- 7) Camber Formation. Laborers use the excavated material to generate the shape of the road. They throw the excavated material along the center line of the road, spread it toward the drains, and compact it with the pedestrian roller to a slope of 5%. Supervisors and laborers can check the slope by using a camber board and a level.
- 8) Gravel Pit Excavation. The DFR identifies nearby sources of natural gravel before the contract is tendered. Once the contract is won and mobilization is under way, the contractor will begin preparing the gravel pit. Each laborer excavates gravel material and piles it into a conical shape  $3\text{m}^3$ . The laborers use mattocks, pick-axes and shovels for this work.
- 9) Gravelling. The contractor hauls the gravel material using a tractor and trailer or a tipper truck, depending on the haulage distance. The gravel is first left by the tractor/trailer in heaps along the road. Then the gravelling gang spreads these heaps using shovels and rakes. The thickness of uncompacted gravel should be 12cm with a

slope of 8%. The contractor must then compact the gravel so that he produces a layer of gravel 10cm. thick with a slope of 6%. He or his supervisors can check this slope using a camber board and a level. The contractor can then achieve a maximum dry density compaction of 98% at optimum moisture content by passing the vibratory roller over the gravel layer 8 times.

#### 10) Construction of Drainage Structures

Laborers construct scour checks, mitre drains and culverts. Scour checks are structures constructed in the drains at particular intervals to prevent erosion by slowing down the water passing over them. The interval between scour checks depends on the slope of the road. The DFR requires no scour checks when slopes are less than 4%. Contractors must also construct 2-meter box culverts.

In most cases, each activity follows the preceding one in fixed order; however, contractors usually begin with gravel pit preparation and construction of culverts.



#### APPENDIX 4: Classification of Domestic Contractors in August 1991

Class	No. of Contractors	Value of Contract (thousands US\$)	Type of Work
A1	4	no limit	Equipment-based road construction, rehabilitation and maintenance
A2	10	2,150	
A3	71	1,080	
A4	61	404	
B1	5	no limit	Bridges and culverts
B2	15	808	
B3	104	404	
B4	186	162	
C	47	337	Labor-based rehabilitation

Source: World Bank. 1991. "Ghana National Feeder Roads Rehabilitation and Maintenance Project, Staff Appraisal Report." Exchange rate figures from World Bank 1992 International Financial Statistics (US\$1 = 371.37)

## **APPENDIX 5: Wage Rates for Casual Labor**

<b>Country</b>	<b>Wage rate (US\$/day)</b>
Tanzania, Nigeria	0.30 - 0.50
Uganda	0.35 - 0.50
Zaire	0.50 - 0.80
Mozambique	0.80 - 0.90
Rwanda	0.90 - 1.50
Eritrea	2.00 - 3.00
Namibia	4.00 - 7.00

Source: Rausch. 1994. Road Contractor Promotion and Employment Generation in Africa. p. 25.

## APPENDIX 6: Comparing EB and LB Contractors

**Table 6.1: CURRENT SITUATION COMPARING EB AND LB CONTRACTORS**

Measure	Unit	Equipment-based	Labor-based
payment <sup>1</sup>	(US\$/km)	22,500	15,000
cost. <sup>2</sup>	(US\$/km)	20,250	13,500
profit	(US\$/km)	2,250	1,500
speed <sup>3</sup>	(km/mo.)	2.1	1.4
monthly payments	(US\$/mo.)	47,2500	21,000.
monthly costs	(US\$/mo.)	42,500	18,900
Ave. labor payment <sup>4</sup>	(US\$/mo.)	500	2,500
monthly profit	(US\$/mo.)	4,750	2,100

**Table 6.2: IF ALL CONTRACTORS ARE PAID THE SAME PER KM**

Measure	Unit	Equipment-based	Labor-based
payment / km	(US\$/mo.)	p	p
cost / km <sup>5</sup>	(US\$/km)	20,250	13,500
profit / km	(US\$/km)	p-20,250	p-13,500
speed	(km/mo.)	2.1	1.4
monthly profit	(US\$/mo.)	2.1(p-20,250)	1.2(p-13,500)

<sup>1</sup>The DFR calculated the labor-based figures based on Sept. 1993 rates for labor-based payments per km. They represent averages from 15 contracts in the Brong-Ahafo and Ashanti regions. The DFR calculated the equipment-based figures based on tenders received in Sept. 1993 in the Central, Western and Brong-Ahafo regions. All these regions have similar topology. Although equipment-based figures are based on tenders and not actual amounts paid, there is very little difference between these two figures.

<sup>2</sup>I calculated this number by assuming that equipment-based contractors earn, on average, 10% profit.

<sup>3</sup>LB can do 1.4 km/mo. Equipment-based can do 2.1 km/mo. (Osei-Bonsu, personal communication)

<sup>4</sup>For Equipment-based, he hires at most 10 people a mo. so he's paying out 500,000 in wages while a LB is paying out around 3 million. (Boakye, contractor).

<sup>5</sup>I calculated this number by assuming that equipment-based contractors earn, on average, 10% profit.

**Table 6.3: MONTHLY PROFIT FOR DIFFERENT PAYMENTS/KM**

<b>payment / km (US\$/km)</b>	<b>Equipment-based monthly profit (US\$/mo.)</b>	<b>Labor-based monthly profit (US\$/mo.)</b>
20,200	-110	9,380
20,400	310	9,660
20,600	730	9,940
20,800	1,150	10,220
21,000	1,575	10,500
21,200	1,990	10,780
21,400	2,410	11,060
21,600	2,830	11,340
21,800	3,250	11,620
22,000	3,670	11,900
22,200	4,090	12,180
22,400	4,510	12,460
22,600	4,930	12,740
22,800	5,350	13,020
<b>average ratio</b>	<b>1</b>	<b>7</b>

Table 5.1 above shows the current situation for equipment-based and labor-based contractors. As of August 1994, equipment-based contractors were being paid US\$7,500/km more than labor-based contractors. With this sort of payment disparity, equipment-based contractors can make more than double the profit per month of a labor-based contractor. If both equipment-based and labor-based contractors are paid the same per km, this scenario changes. Table 5.2 shows the equations for calculating the profit per month when both contractors are paid equivalently. Table 5.3 illustrates how much profit per month each of these contractors makes, for different payments per km. For example, if a labor-based contractor and an equipment-based contractor are both paid US\$24,400 per km, an equipment-based contractor will earn US\$310 per month profit while a labor-based contractor will earn US\$9,660 per month profit. For the payments/km shown in Table 5.3, labor-based contractors make, on average, seven times more profit per month than equipment-based contractors.